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EFFECTS OF LLLT ON TRIGEMINAL NEURALGIA PAIN.
Antonio Luiz Barbosa Pinheiro, Cecília Thereza Alcantara Manzi; Alessandro Leonardo de Barros Vieira, Aluizio de Barros Rolim. Laser Center, Universidade Federal de Pernambuco

The authors on the effects of LLLT in the treatment of Trigeminal Neuralgia pain. This paper reports the results of the use of LLLT on the treatment of Trigeminal Neuralgia pain and presents LLLT as an effective method of treating such problem. Fifty five female and 10 male patients aged between 27 and 82 years old (average 55.3 years old) suffering from Trigeminal Neuralgia pain were treated with 632,8, 670, and 830nm diodes Lasers at the Laser Center of the UFPE. The treatment consisted of a series of 12 applications twice a week. The average dose used was 1.7J/point. Fourteen patients were treated only with 830nm laser radiation; three cases were treated with 670nm ; six were treated with 635nm; ten were treated with 830nm + 670nm; and 32 cases with 830nm + 635nm. Forty two patients were asymptomatic at the end of the treatment, nine improved considerably and 14 were symptomatic. These result show that LLLT does help controlling pain on Trigeminal Neuralgia.

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COSMETIC LASER DENTISTRY IN PRACTICE

Martha Cortes
New York City , New York USA

Laser assisted dentistry is changing the formalized nature of dentistry. One must re-think all the biochemical and physiological processes involved, and develop new treatment protocols and strategies. Laser assisted cosmetic dentistry represents an exponential jump of thinking and experience. It is the ultimate in patient communication of excellence and applied hi-advance technology. High speed periodontal plastic surgery, laser assisted treatment of periodontal disease, operative, prosthodontics and endodontics are possible with our laser technology of today. The first two cases accomplish a smile lift, consisting of expanding and lengthening the anterior maxillary segment with the assistance of a combination laser curettage, laser bleaching, laser gingivectomy, polymer ceramic bridge and porcelain veneers. The third case involves the other great advantage of lasers in the enhancement of overall health. The Nd:YAG and other lasers produce a site specific inflammation, reduces the bacterial count, and enhances healing in periodontal disease via a specific cytokine release. The cytokines have a special role in the pathophysiology of disease and may have potential as targets of specific disease therapy and provide a more effective anti-infective therapy.

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UTILIZATION OF THE ERBIUM YAG LASER TO ENHANCE ESTHETIC DENTAL PROCEDURES
JAMES M. STEIN - BOSTON, MASSACHUSETTS
Clinical case review of the Erbium YAG Laser for placement of porcelain laminate veneers,crowns, inlays, and implant-supported restorations. The Erbium YAG Laser was used since October, 1997 in clinical practice to improve a myriad of esthetic dental procedures involving hard and soft tissue removal and treatment. Clinical cases are presented as evidence of natural esthetic results and to discuss resin bond improvement, decreased caries, susceptibility tooth/tissue preparation without the high speed drill and local anesthetic.

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Wet Dentistry Report: One Year Experience with an Er,Cr:YSGG Laser

William A. Greider, DMD

Dr. Greider has used in his practice for over one year an Er,Cr:YSGG laser for both hard and soft tissue procedures. He will show and comment on its effectiveness. Dr. Greider has experience with the following lasers: Er:YAG, diode and argon. He incorporates in his practice today diode and argon lasers, and air abrasion. He will provide the audience information how an Er,Cr:YSGG laser fits into a practice with a multitude of various patients and cases. He will compare the efficiency of the Er,Cr:YSGG laser in combination with an air-water spray, creating a hydrokinetic effect in cutting hard target tissues with typically no anesthesia to other modalities he has or is using. A real time video will be presented and patient acceptance discussed.

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Holmium: Surgical Wavelength with Fiberoptic Precision by Emile Martin D.D.S.

This presentation will present an overview of the various wavelengths available for soft tissue removal with an emphasis on the history and development of the Holmium modality. Documented cases will be presented. The cases will include: frenectomy, papilloma removal, implant second stage opening, fibroma removal, tissue welding, gingivectomy, and laser assisted mucocele removal. Where appropriate, histological tissue evaluations will be provided. Holmium will be shown to be a safe and effective laser wavelength for soft tissue surgery with the added dimension of fiberoptic handpiece precision.

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Common General Dentistry Applications for the Diode Laser

Michael D. Swick, DMD

The Ceralas D 980nm diode laser was used for four case studies in general dentistry. The laser operates at 980 nanometers with a fiber optic delivery system.
The first case study involved bilateral operculectomies for caries restoration in lower second molars. The laser was used to ablate and coagulate the opercular tissues covering the distals of the lower second molars in order to facilitate the restoration of cariuos lesions which had been delayed for two years pending their eruption.
The second case involved a maxillary frenectomy. In this case the laser was used to remove a fibrous maxillary frenum in a patient in which the frenum was causing periodontal problems. The excellent cutting and coagulative capabilities of the laser are demonstrated in this case.
The third case involved a gingivectomy. In this case the gingival hyperplasia of a patient on dilantin therapy is removed in order to facilitate plaque removal and gingival health. This study demonstrates the coagulative capability of the laser in performing a procedure which has enormous potential for bleeding and pain post-operatively.
The fourth case was debridement of sulcular tissue of a periodontal pocket. It was removed in order to facilitate healing of the gingival attachment at a higher level. There was no bleeding or post operative pain normally encountered with this procedure.

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LASER ASSOCIATED TO CAD-CAM SYSTEM

F.Zanin,,*; A.Brugnera Jr., *;F.M.Cruz, **; J.D.Pécora,***.
*-Laser Center Camilo Castelo Branco University and Laser Center at A P C D - Associação Paulista dos Cirurgiões Dentistas-EAP-São Paulo - SP - Brazil
**- Laser Center - Camilo Castelo Branco University - São Paulo-SP-Brazil
***University of São Paulo-FORP- São Paulo - Brazil

The technology in dentistry has been developed significantly in the later years, increasing the technological level of materials, methods and equipments.
Undoubtedly the CO2 laser has contributed to this evolution and particularly to the treatment of infected dentin. CO2 laser can sterilize and promote an increase of 6 to 8 times dentin's resistance, transforming hydroxiapatite into calcium-phosphate-hydroxiapatite. We can assure our patients about the use of CO2 laser, better preservation of dental structure and its benefits that permits advanced esthetic treatments, as CEREC system, which through a scan-system registers a tridimensional imge of the prepared tooth, sending it to the computer. The operator will edit the porcelain restoration, that will be finished by the equipment.

Results obtained demonstrates that a good indication of CO2 do not cause any discomfort; pulp vitality and dental function was kept after computer machined porcelain restoration.

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DENTIN ROOT CANAL WALL PERMEABILITY AVALUATION AFTER INSTRUMENTATION AND Er YAG LASER APLICATION.

J.D.Pécora #, A.Brugnera* Jr; A;L.Cussioli #, R.S.Silva. #, F.Zanin*
University of São Paulo-FORP-São Paulo-BRAZIL #
-Laser Center at APCD-Associação Paulista dos Cirurgiões Dentistas-São Paulo-BRAZIL *

Dentin root canal wall permeability was studied after endodontic treatment and Er YAG laser application. It was used 25 human maxillary incisors extracted. The teeth were divided in 5 groups . Group I - deionized distilled water as irrigating solution ; Group II - 1% sodium hypochlorite ; GroupIII - deionized distilled water as irrigating solution and laser application. Group IV- 1% sodium hypochlorite solution as irrigating solution and laser application; Group V - root canal prepared only with laser irradiation. The laser parametres were: 15 Hz, 140 mj, total energy 42 joules, 300 impulses (Kavo Key Laser) each irradiated tooth. To evaluate the dentinary permeability was used a watered 10% cupper sulfatesolution. The penetration of cupper sulfate solution. The penetration of cupper ions innto the dentinal tubules was observed by the 1% rubeanic acid shows cupper ions producing an insolved salt, the cupper rubeanic, wich color is from ions concentration.After a histochemical reaction, the teeth were cutted tranversaly each 500 micrometer and the cuts were separeted in order to have 2 cuts from each part of the root.
It was seen that when it was used water irrigating solution plus Er YAG laser, the dentinary permeability was incresed, much more if compared with the other groups, what helps the mechanical adhesion from the root canal sealer . And the use of hypochlorite solution decrease this adesion.

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CLINICAL STUDY OF THE LASERTERAPHY ANTINFLAMATORY ACTION ON THE TISSUES REPARATION AFTER IATROGENICS TRAUMA

R. C. Rodrigues, E. Engelmann; A. Brugnera ; L.A.Lopes; D. A. Duarte.
LASER CENTER CAMILO CASTELO BRANCO UNIVERSITY – SP – BRAZIL

The use of a rubber dam isolation is very common when treating children, but generally we notice traumatic lesions proceeding from the incorrect adaptation of the clamps . For this study, 42 patients ,aging from 3 to 10 years ,from both sex were attended . They were randomly divided in 3 groups; (A1,A2,A3). These groups were observed after the end of the procedure, after 48hs. and at 1 week. Groups A1 and A2 had the same time of application, dosimetry, form and localization of the points that was irradiated. In the group A1, was made an irradiation with diode laser with low density of energy (635nm/4mw,with spot of 3mm/cm^2). The dosimetry by session was 2 J/cm^2, but 0.83J/cm^2 was applied punctually on the mesial and distal and 0.24 J/cm^2 in scanning mode completing a time of 8 minutes. A2 group, received an irradiation with diode laser, in low density of energy (830nm/40mw with spot of 3mm/cm^2). The A3 group, was the control group and didn't suffer any kind of procedure. The results of this study, was obtained through a visual method and a pain's subjective index in the A1 and A2 groups, after 48hs. After the irradiation, an area with a normal coloration aspect was observed . There wasn't reports of dolorous symptomatology. But in the A3 group, the control group , an area with reddish aspect was observed and there was several reports of discomfort in this area. After 1 week, the areas which were traumatized in the A1, A2, A3, groups became repaired totally. Based on the results, it was concluded that both treatments with diode laser using low densities of energy, at wavelength of 635nm/4mw and 830nm/40mw, were effective for tissues reparation and also for analgesia.

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CLINICAL RESULTS AVALUATION OF DENTINARY HYPERSENSIBILITY PATIENTS TREATED WITH LASERTHERAPY

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The purpose of this investigation was to show the percentage of cured patients treated with Low Level Laser Therapy clinically diagnosed dentinary hypersensibility.
The authors report on this investigation more than 300 human teeth treated at Camilo Castelo Branco University during the years of 1995,1996 and 1997. Pulpal vitality was verified using thermal tests, and only reversible process were treated. The teeth were dried with cotton pellets and the laaser beam was directly and perpendicularly applied. The lasers used were He-Ne Laser (632,8 nm), and ArGaAl Lasers (780nm and 830 nm), and each tooth received 4 joules/session. Each tooth was treated until 5 sessions. 79,13% of patients were treated in 3 sessions.87,71% of patients were treated in 4 sessions. And 92% of patients were treated in 5 sessions.
Laser Therapy is an effective and usefull treatment to dentinary hypersensibility.

DERMATOLOGY/ PLASTIC SURGERY

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MULTICENTER STUDY OF LONG-PULSE RUBY LASER HAIR REMOVAL.

Rox Anderson MD, A. Jay Burns MD, Jerome Garden MD, David Goldberg MD, Melanie C. Grossman MD, George Hruza MD, Suzanne Kilmer MD, Sharyn Laughlin MD, Harvey Lui MD, Elise Olsen MD.

200 patients ranging from skin phototypes I-V seeking hair removal were entered into an open-label prospective clinical trial of Epilaser (Palomar) treatment, at 10 participating study centers. This laser emits 694 nm, 3 ms 1 Hz pulses delivered through a cold sapphire convex lens pressed against the skin surface. Standardized photographs were taken at fixed magnifications prior to the first treatment, which was given after a moratorium period for other hair-removal methods. Up to 6 treatments were then given as needed, over a 1 year period, at fluences ranging from 10 J/cm2 to 60 J/cm2 using exposure spot sizes of 7 mm or 10 mm, with treatment intervals of approximately 2 months Clinical assessment and standardized photographs were made during, and at 3 and 6 months, after the final treatment, during which no other hair removal treatments were allowed. The mean number of treatments given was approximately 4. Clinical assessments showed apparent hair loss at 6 months after the final treatment, and a trend of less hair regrowth with each successive treatment; blinded assessment of hair loss at 3 and 6 months after the final treatment is now being performed. The incidence of scarring is 0 % to date. Histology showed acute and selective thermomechanical damage of pigmented hair follicles. In patients with long-term hair loss, coarse terminal hair is replaced by miniaturized vellus-like hair follicles, without fibrosis. Quantitative results at the end of this study (February 1999) will be presented. This study was supported by Palomar Medical Technologies, Inc.

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COMPARISON OF DIFFERENT LASERS AND LIGHT SOURCES HAIR REMOVAL

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To evaluate and compare a flash lamp pulsed light source- (590-1200 nm, 2.5-5 ms, 30-65 J/cm^2), two long pulsed ruby lasers (694 nm, 3 ms, 10-40 J/cm^2, 7-10mm), (694 nm, variable, 10-100 J/cm^2, 7-10mm chill tip) long pulsed alexandrite laser (755nm, 3 ms, 10-6- J/cm^2, mm) and long pulsed diode laser(800 nm, 5-20 ms, 9mm, 10-40 J/cm^2) at producing hair removal.

11 test sites were mapped in 20 light skinned (type I-III) dark haired subjects. After baseline hair counts were obtained, subjects received a single treatment to 10 test areas (two treatments were done with each laser at both the maximum tolerated fluence and the minimum fluence available). Hair counts and follow photographs were obtained at one, three, six and nine months after treatment.

Early results available at the time of writing this abstract show a growth delay at all laser treated sites.

Safe and effective hair loss is possible with all light systems tested.

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PROLONGED CLINICAL EXPERIENCE WITH LASER-ASSISTED HAIR REMOVAL: A CLINICAL COMPARISON OF SYSTEMS

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PURPOSE: To investigate the clinical effectiveness of several different lasers (Q-switched Nd:YAG, long-pulsed ruby, long-pulsed alexandrite, and long-pulsed diode) in the removal of unwanted facial and body hair.

METHODS: Patients with pigmented terminal hairs were consecutively enrolled in an ongoing clinical evaluation of four different laser types. The clinical effectiveness of three consecutive laser treatments at appropriate energy densities and laser treatment intervals were determined by sequential photographic analysis at each session and 6 months following the final treatment. Hair counts were obtained in a representative number of patients in each laser group. Patient satisfaction with treatment and presence of side effects were recorded at each visit.

RESULTS: Q-switched Nd:YAG laser irradiation resulted in the greatest degree of hair regrowth and the least amount of patient satisfaction, but a lower side effect profile. Long-pulsed ruby, alexandrite, and diode laser treatments provided similar rates of hair

regrowth with a high degree of patient satisfaction. Side effects were minimal, with transient pigmentary alteration the most frequently encountered. No scarring or fibrosis was seen.

CONCLUSION: Long-pulsed ruby, alexandrite, and diode laser irradiation can provide long-standing and effective hair removal with minimal side effects and is superior to the results obtained with Q-switched Nd:YAG laser treatment.

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HAIR REMOVAL BY FLASH LIGHT: LONG-TERM RESULTS

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To evaluate the long-term results of hair removal by a non-coherent filtered flash lamp hair counts where obtained after 1 year. The back of a 25 year old male was treated in 8 different fields using an intense light source (EpiLight™). All areas where shaved. Area 3-8 were then treated once. Area 2 was treated 3 times with monthly intervals. Pulse length (2,9 msec) and delay (22 msec) remained unchanged. The energy density per pulse was kept within similar limits (11-16 J/cm^2).

Area	# of treatments	Cut off (nm)	# of pulses	Energy density/ pulse (J/cm^2)	Total energy density (J/cm^2)	Hair counts per cm^2
1 (control)	1					19,4 (100 %)
2	3	645	3	12,7	38,0	**5,5 (25,1%)**
3	1	645	3	12,7	38,0	12,3 (63,4%)
4	1	645	4	12,9	51,7	9,8 (50,2%)
5	1	695	3	10,9	32,6	12,3 (63,4%)
6	1	695	4	11,1	44,5	8,7 (44,6%)
7	1	615	2	16,0	32,0	14,7 (75,4%)
8	1	615	3	16,3	49,0	11,6 (59,6%)

After 1 year the mean reduction of hair counts was 40% (single treatment). This result was improved by either the number of pulses or the repetition rate. The reduction of hair counts was still 75% 10 months after 3 repeated treatments. The reduction was similar using the cut off filters 645 and 695 nm, while 615 nm showed the lowest reduction of hair counts. Long term results after 21 months will be reported.

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MECHANISMS FOR INDUCTION OF TEMPORARY HAIR LOSS.

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The fluence dependency and the histological changes of permanent hair removal are well understood. On the other hand, several important questions remain for the growth delay effect.A study was therefore performed to study the biological events responsible for the induction of temporary hair loss after laser exposure. In order to determine the lowest fluence capable of inducing a growth delay effect, 8 fluences, in a geometric series with 40% increments (2.5,3.5,5,7,10,14,20 and 28J/cm^2) were tested in 12 subjects, using a normal-mode 3 ms, 694 nm, ruby laser (Palomar Medical Technologies). Additionally, there was a shaved, unexposed control site. Hair counts were obtained prior to treatment and at 1,3 and 6 months post laser treatment using digital images obtained with a CCD camera. To determine if the duration of growth delay was dependent on fluence, a correlation between the fluence and the % of hair loss over time, was done. Biopsies were taken from each subject at different time points after laser treatment: 1 day, 1 week or 1 month. Immunohistochemical staining for apoptosis (Transferase-mediated dUTP Nick End Labeling, Tunel stain) and for cell arrest (proliferating cell nuclear antigen, PCNA) were performed. The histology showed a mixed pattern: induction of catagen and/or telogen follicles, next to degenerated hair follicles. Immediate hair growth delay after laser treatment, can be due to perturbation of the hair cycle, causing telogen, or to qualitative changes in the hair shaft causing a transition from the normal anagen phase into a dystrophic anagen phase. The type of reaction depends on the amount and duration of the damage inflicted.

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THE EFFICACY OF PHOTODERM VL AND HR SYSTEM IN HAIR REMOVAL.- LONG-TERM FOLLOW-UP

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Purpose:The use of nonlaser light has recently been described for the removal of unwanted or excess hair. In this technique, an intense pulsed white light is modified using an appropriate filter to deliver light with a wavelength greater than 500nm to the skin for selective thermal injury to the hair follicles. This system allows adjustment to be made to the pulse duration and the wavelength. This is done depending on the patient's skin and hair color. The purpose of this study is to determine the long-term results of PhotoDerm VL and HR in hair removal.
Methods:Two groups of patients were treated. The first group was treated using PhotoDermVL system (82 patients, 13 drop outs); the second group was treated with the PhotoDermHR system (58 patients, 10 drop outs). Subjects received 1-3 treatments using one of four cut-off filters consisting of 2-3 pulses with energy densities ranging from 32-42 Jcm^2.
Results:First group (PhotDermVL) had an average range of 26-32% hair removal after 7-9 months follow-up. The second group (PhotoDermHR) had an average range of 32-60% hair removal after 7-9 months follow-up. The side effects were minimal and included edema, and erythema. A few developed transient hypo or hyperpigmentation that resolved over the follow-up period.
Conclusion:PhotoDerm HR system is more effective in hair removal than the VL system. Patients with skin types I-III and darker hair color had better results. There were minimal short-term side effects. This system has the advantage that the hand piece is larger, allowing a larger area of treatment in a shorter period of time. The wavelength and pulse duration, and energy level can be adjusted to fit the patient according to skin type and hair color.

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FLASHLAMP TREATMENT FOR HAIR REMOVAL MORPHOLOGIC AND IMMUNOHISTOCHEMICAL FEATURES OF PROLIFERATION AND APOPTOSIS OF HAIR FOLLICLES

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Purpose: The clinical and histologic effects of a high intensity flashlamp photoepilation source (EpiLight) are reported.

Methods: Four men and five women, aged 19-41 (mean 31 yrs) each received a single treatment with high-intensity pulsed light cutoff filter (590/615 nm, fluence 41J/cm2, spot size 10 x 45 mm, Double pulse mode, pulse duration 3.0 msec, pulse delay 10 msec) to hairy skin of the groin, chest, or abdomen. A mean hair removal efficiency of 47% at 6 months was noted. Hair removal efficiency of 54% was noted at 12 months. Expression of a proliferation marker (Ki-67), cell cycle proteins (*bax, bcl-2, p53, cyclin D1)*, and a heat shock protein (hsp70) were analyzed.

Results: Immediate clumping of melanin within hair shafts and hypereosinophilia of the inner root sheath was noted. At 48 h, apoptotic keratinocytes (KC) were observed in the bulb area; the stroma was edematous and contained a sparse lymphocytic infiltrate. At 1 week, the affected follicles displayed apoptotic cells, markedly distorted hair shafts, follicular lumina, and perifollicular fibrosis. Immunohistochemically damaged hair follicles still showed high numbers of proliferation KC in the hair bulb (as revealed by Ki-67 expression). No significant differences were detected with regard to *bax, bcl-2, cyclin D1, p53, or hsp70.*

Conclusions: 1) High intensity flashlamp treatment induces long-lasting hair epilation. 2) The predominant mechanism appears to be selective photothermal destruction of large pigmented hair follicles, probably related to transfer of energy to germinative areas containing melanin, rather than induction of a programmed state of follicular cycle arrest.

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THE INTENSE PULSED LIGHT SOURCE FOR LONG-TERM HAIR REMOVAL – 2 YEAR RESULTS AND ADVERSE REACTION PROFILE

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The intense pulsed light source for long-term hair removal has been shown to be safe and effective for epilation. The purpose of this discussion is to review the original FDA three-month study protocol, 1 year results from the same series, and now 2 year results. With one treatment with the intense pulsed light source, 24 patients were followed for 1 year with an average hair loss of 75%. At 2 years, 62% of the treated area remained hair-free. We also reviewed 6 months consecutive treatments (6,000 treatment sessions) to document adverse reactions. Post-treatment erythema for several hours was an expected occurrence and not part of the adverse events. The reactions included superficial burns, crusting, and footprinting. These resolved within a 4-6 week post-treatment observation time. Long-term hypopigmentation or hyperpigmentation have not been evident. With proper training and proper parameter selection, adverse reactions with the intense pulsed light source are low.

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ERBIUM:YAG AND CO_2 LASER RESURFACING OF THE SAME TREATMENT AREA.

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Both the Er:YAG and CO_2 lasers have been used as resurfacing instruments. Each laser offers the patient clinical advantages. The CO_2 laser delivers more thermal damage than the Er:YAG with the ability to induce greater dermal collagen remodeling, while the Er:YAG may have a more desirable post-operative course. Using both lasers over the same area may be able to combine these advantages for the patient. However, it is unknown as to whether there is a clinical difference in the sequence of usage of these lasers. Ten patients with either facial rhytides or acne scarring were treated with both the CO_2 and Er:YAG lasers. One side of the treatment area received CO_2 laser followed by the Er:YAG, while the other side was treated in the reverse order. Laser parameters were the same for each laser over each side for the individual patient. Patients were evaluated at day 4 and 7, and week 2, 4, 8, and 12 for erythema, reepithelialization, hyperpigmentation and clinical improvement. Upon evaluation, there did not appear to be any significant difference in the healing rate, occurrence, degree, and resolution of erythema or hyperpigmentation and clinical improvement for either side. Although there may be a theoretical advantage of using the Er:YAG last to reduce the CO_2 laser layer of tissue damage, this does not appear to be clinically manifested. Therefore, the use of both systems can be used to their advantage over the same treatment area in any sequence the clinician chooses.

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DETAILED HISTOLOGIC ANALYSIS OF A NEW COMBINATION LASER DELIVERING SIMULTANEOUS ERBIUM:YAG AND LOW DOSE CO2

AC Harrington, RA Weiss, R Pfau, MA Weiss, Baltimore, MD

Although many claims for efficacy and decreased side effects in skin resurfacing are made for Er:YAG devices, histologic confirmation of depth and type of injury is sparse. Histologic evaluation of depth of ablation and thermal injury were performed on skin of 10 patients undergoing reconstruction following skin cancer removal with Mohs micrographic surgery. The tissue utilized in the evaluation was from Burrow's triangles which ordinarily would have been discarded.

Comparison of Er:YAG alone at 21.2 J/cm2 (1.7J - 3mm collimated beam) using 1, 2 and 3 passes with and without simultaneous delivery of CO2 (1-5 W, 10 – 50 msec pulse) was performed. These set of parameters plus controls of CO2 alone were all delivered using the Derma K system (ESC/Sharplan, Needham, MA).

The skin removed following Er:YAG laser ablation alone showed complete removal of the epidermis with one pass. Beneath the areas of epidermal loss, a very small zone of papillary dermal thermal injury represented by hyalinized eosinophilic staining measuring approximately 10 microns was observed. With additional passes there was a trend toward small increases in dermal ablation of 5-10 μ accompanied by small increases (5-10 μ) in dermal thermal injury. With the simultaneous delivery of CO2 laser at 1-5W, 10–50 msec, we observed increasing depth of dermal ablation and thermal injury directly proportional to increasing CO2 fluence. Minimal necrotic debris similar to Er:YAG alone was observed. As expected, marked necrotic debris was observed with CO2 alone. We conclude that simultaneous delivery of Er:YAG with low dose CO2 leads to a slight increase in depth of dermal ablation and thermal injury while maintaining most of the distinct histology of Er:YAG alone. This may lead to improved clinical results for simultaneous Er:YAG/low dose CO2 but allow reduction of morbidity associated with CO2 alone.

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6 MONTH IN-VIVO MODEL OF HISTOLOGIC CHANGES FOLLOWING TREATMENT WITH THE SUPERPULSED CO_2 LASER, ERBIUM:YAG LASER, AND BLENDED LASERS

David Greene and R. J. Koch, Stanford University Medical Center.

Purpose and Background: To compare the *in vivo* histologic effects of the carbon dioxide (CO_2) and erbium:yttrium aluminum garnet (Er:YAG) lasers, and to assess the effects of combining CO_2 and Er:YAG laser modalities during a single treatment session. We previously reported 10 patients treated with 4 laser regimens: CO_2 alone, CO_2 /Er:YAG, Er:YAG alone, Er:YAG/$CO_2$with time points at 1 hour and 7 days between laser treatment and histologic analysis. This study found that the optimum treatment consisted of limited CO_2 laser passes followed by Er:YAG. This treatment produced less collagen injury, less thermal necrosis, and more robust epithelial and dermal fibrous tissue regeneration. In a six-month extension of this study, we compare blended CO2/ER:YAG with CO2 followed by ER:YAG, as well as solitary CO2, Erbium, and phenol.

Methods: Ten patients with actinic damage and indications for rhytidectomy volunteered for this interventional study in which each patient served as both experimental and control. Study was approved by the Internal Review Board. Six months prior to rhytidectomy the right preauricular area was treated at 5 sites with CO2, CO2 followed by Er:YAG, Er:YAG, Blended CO2/ER:Yag, and Baker-Gordon Phenol Solution. Six months later, identical sites in the left preauricular area were identically treated 1 hour prior to rhytidectomy. Laser treated skin was excised during rhytidectomy and was evaluated histologically by the study dermatopathologist who was blinded to the treatment at each site.

Results: After 7 days, all skin sites in the first phase study were re-epithelialized and showed equal neo-collagen formation. After 7 days, CO_2/Er:YAG and Er:YAG alone had the least collagen injury and thickest epidermis and papillary dermis of all groups. Specimens laser-treated 1 hour prior to excision showed the least collagen injury and thermal necrosis when treated with CO_2/Er:YAG and Er:YAG alone. Four passes with CO_2 removed 250 μm of tissue, while 8 passes with the Er:YAG removed 160 μm of tissue. Results from the 6 month study group are pending.

Conclusions: To accurately compare various laser technologies and treatment regimens, long-term histology is necessary. Few long-term histologic studies of the changes induced by laser exist. To date, we have found that CO2 followed by ER:YAG produced the best results at the 1 week time point. The 6 month group will provide more clinically relevant data. This group will also provide data on the different long-term changes induced by phenol peels compared to the various laser regimens.

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USE OF A NOVEL ERBIUM LASER IN A YUCATAN MINIPIG: A STUDY OF RESIDUAL THERMAL DAMAGE (RTD), ABLATION, AND WOUND HEALING AS A FUNCTION OF PULSE DURATION. EV Ross, JR McKinlay, FP Sajben, CH Miller, DJ Barnette, KJ Meehan, NP Chhieng, BD Zelickson* Departments of Dermatology, Naval Medical Center San Diego, CA 92134 and the University of Minnesota.*This study's purpose was to quantify thermal damage and ablation for an erbium laser with a variable pulse width coagulation mode (Contour, Sciton, Palo Alto), as well as compare these values with a popular CO_2 resurfacing laser (UltraPulse, Coherent, Palo Alto). The erbium laser delivered a typical ablative pulse (250 μsec), followed by a heating pulse of variable duration. Pulse durations for specific coagulation depths were selected based on existing models of heat transfer. The bilateral flanks of one Yucatan pig were irradiated with settings as per the table. Biopsies were performed just after treatment and 1 and 7 days postoperatively. Additional biopsies will be obtained 21 and 60 days postoperatively. Gross exam immediately after treatment showed surface yellowing for erbium Groups 4 and 5 comparable to two and three pass CO_2 sites. Other erbium sites (Groups 1-3) showed a pinker papillary dermis consistent with conventional erbium laser ablation. Biopsies showed variable immediate thermal damage that increased with erbium pulse duration. The exception was the 200 μm setting, where actual RTD was significantly less than that predicted by the model. All wounds healed uneventfully by 14 days. We conclude that a variable macropulse pulse width erbium laser is capable of achieving RTD of up to 100 μm.

Group #	Laser	Spot size (mm)	Coag Settings	# passes	Actual Dermal RTD (μm)	# passes
1	erbium	4	0 μm	5	20	5
2	erbium	4	25 μm	5	35	5
3	erbium	4	50 μm	5	55	5
4	erbium	4	100 μm	5	80-100	5
5	erbium	4	200 μm	5	80-100	5
6	CO_2	2.25	NA	2	120	2
7	CO_2	2.25	NA	3	130	3

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Variable Pulse Thermal / Ablative Er:YAG Laser Resurfacing of Peri-Oral Rhytids and Side-By-Side Comparison with CO_2 Laser.

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From the Laser Center of Virginia[1], Virginia Beach, Virginia. The Dept of General Surgery2, Naval Medical Center Portsmouth, Virginia. Eastern Virginia Medical School[3], Norfolk, Virginia.

Purpose: To prospectively study the clinical and histological effects of the Variable Pulse Thermal / Ablative Er:YAG Laser. To establish a treatment protocol to ablate the skin, producing a level of thermal injury as similar as possible to current CO_2 Laser systems, while maintaining a reduced time to heal and low complication rate of the Erbium Laser .

Methods: Histological analysis of freshly harvested human skin was performed with the Cynosure Variable Pulse Er:YAG Laser, and compared with the Coherent Ultrapulse CO_2 Laser. Forty treatment sites on twenty patients were randomized and evaluated following treatment of the upper lip region with a split treatment of the Variable Pulse Er:YAG Laser and the CO_2 Laser. The treatment parameters were as follows for the Er:YAG Laser: a 5mm spot size on all treatments; 4 passes with 5.1 J/cm^2 at 10ms; followed by 1 pass at 2.5 J/cm^2 at 10ms; a final single pass was performed at 5.1 J/cm^2 at 500us. CO_2 treatment was performed with the Ultrapulse CO_2 at 300 mJ/Density 6/ two passes. Patient diaries were maintained, and blinded objective evaluation was performed.

Results: Histologically, the CO2 laser produced significantly more thermal necrosis than any of the "Thermal Mode" Er:YAG pulse durations. Patients reported decreased pain, itching, crusting and healing time following treatments with the Variable Pulse Er:YAG Laser. A detailed comparison of the clinical results of these two systems and effects on moderate to deep rhytids will be compared in detail. Results of Variable pulse Er:YAG Laser on Asian skin will be presented.

Conclusions: The Variable Pulse Er:YAG laser is a safe and effective tool for resurfacing of facial rhytids in type I-IV skin. The longer pulse option has allowed the surgeon to achieve improved efficacy with moderate / deep rhytids than with the current 300 to 350us Er:YAG units

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CLINICAL, HISTOLOGIC, AND ULTRASTRUCTURAL EVALUATION OF ACTINICALLY DAMAGED SKIN TREATED WITH THE PULSED DYE LASER AND A HIGH ENERGY PULSED LIGHT SOURCE. Brian D. Zelickson, David A. Kist, Mona Selim, David Mehregan. University of Minnesota Hospital & Clinic, Minneapolis, MN. Pinkus Laboratory, Monroe MI.

Purpose: The purpose of this study was to evaluate the effects of the pulsed dye laser and a high energy pulsed light source on solar elastosis and type I collagen.

Methods: The periorbital areas of twenty subjects were treated with either a pulsed dye laser (585 nm wavelength, 0.45 msec pulse duration, 10 mm spot size, 3 - 5 J/cm^2, the Photoderm (590 filter, 4.5 / 4.5 msec pulse, 10 msec delay, 42 J/cm^2), or the Epilight (645 filter, 4.5 / 4.5 msec pulse, 20 msec delay, 38 J/cm^2). The subjects were treated twice at a 6 week interval. Photographs and skin biopsies were taken prior to and at various time points after treatment. Bovine tendon was treated with the same devices and examined with scanning and transmission electron microscopy to evaluate the immediate effects on type I collagen. Blinded independent observers evaluated the clinical and histologic response at varying time points.
Results: Moderate reduction in periorbital clinical wrinkling was detected after treatment with all devices. This clinical response was associated with histologic changes including a thickened epidermis and new layer of connective tissue in the superficial dermis. Many active fibroblasts were detected in the dermis. Bovine collagen fibers showed enlargement in diameter after being exposed to all systems.
Conclusion: Both the pulsed dye laser and high energy pulsed light source can induce clinical and histologic improvement in actinically damaged skin. Although, collagen fibers show signs of contraction immediately after treatment the clinical effects appear to be related to the development of new dermal connective tissue. This study shows that this effect is not unique to one system.

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FAMCICLOVIR AS ANTIVIRAL PROPHYLAXIS IN LASER RESURFACING PROCEDURES

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Latent herpes simplex virus (HSV type I and II) may be re-activated by laser resurfacing procedures, presenting serious postoperative complications in approximately 90% of patients. Perioperative prophylactic administration of nucleoside analog antiviral agents has been shown to decrease the duration and severity of postsurgical herpes infection and to prevent recurrence. This study was conducted to assess the efficacy of famciclovir in preventing orofacial herpes virus reactivation as well as primary infection in patients undergoing laser resurfacing. HSV history was obtained from 121 patients undergoing the procedure. Antiviral prophylaxis with famciclovir was begun 1 to 2 days prior to surgery and continued for 5 days postsurgery. Those patients with no history of orofacial herpes (n=94) received 125 mg famciclovir twice daily. Patients with a history of orofacial herpes (n=27) received 250 mg famciclovir twice daily. Post surgical HSV infection rates in patients receiving famciclovir prophylaxis were compared with that from a similar group of patients (n=127) receiving no prophylaxis. In patients receiving famciclovir prophylaxis, one patient (1.1%) in the HSV-negative history group and no patients in the HSV-positive history group had postsurgical herpes infection. Famciclovir significantly reduced post surgical herpes infection when compared with 9.4% of patients receiving no prophylaxis (P=0.003). This study suggests that twice-daily famciclovir prophylaxis markedly reduces orofacial herpes virus infection in patients undergoing laser resurfacing.

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PROPHYLACTIC FLUCONAZOLE PROMOTES RE-EPITHELIALIZATON IN FULL-FACE CO_2 LASER SKIN RESURFACING. Howard Conn and Vandana S. Nanda. Beckman Laser Institute, University of California, Irvine, CA, USA

Purpose: The purpose of this study was to determine if prophylactic fluconazole increases the rate of re-epithelialization in patients undergoing full-face CO_2 laser skin resurfacing.
Methods: 91 patients underwent full-face CO_2 laser skin resurfacing with the Coherent Ultrapulse 5000. At least two passes of 300 mJ, density 5, were used except periocularly. All patients received acyclovir 400 mg tid pre- and postoperatively. 48 consecutive patients received cephalexin or ciprofloxacin for 7 days postoperatively. The subsequent 43 patients received 300 mg of fluconazole on postoperative days 3 to 8, in addition to daily ciprofloxacin. Time for complete epithelialization was compared between groups with t-test.
Results: Patients receiving fluconazole and ciprofloxacin re-epithelialized significantly faster than those who did not receive fluconazole (7.65 ± 1.20 days vs. 10.27 ± 2.94 days; p< .0001). 95% of patients with combination therapy healed by day 9 versus only 52% of patients who used ciprofloxacin or cephalexin alone.
Conclusion: Fluconazole administered postoperatively between days 3 and 8 significantly promotes re-epithelialization in patients undergoing full-face CO_2 laser skin resurfacing.

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COMBINED ERBIUM:YAG AND CO_2 LASER PERIORBITAL SKIN RESURFACING

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Purpose: To assess the histologic and clinical efficacy of combining two different laser modalities for cosmetic periorbital skin resurfacing.
Methods: 23 patients underwent two applications (passes) of an Erbium:YAG laser (1 Joule, 10 Herz, 3 mm handpiece, Derma 20, ESC Medical, Inc.) to ablate the epidermis followed by a single application of a CO_2 laser (300 mJoules via handpiece, NovaPulse, ESC) to the dermis. Re-epithelialization time, duration of erythema, and skin biopsies were evaluated. These parameters were compared via Student's t-test with a historic control of 25 patients who had previously received two applications of the same CO_2 laser at the same laser settings. The two laser groups were similar in age, gender, and skin type distribution and received the identical skin care regimen perioperatively.
Results: Mean skin re-epithelialization time was 7 days (range 4-8) in the combined laser group versus 12 days (range 10-14) in the CO_2 laser only group (p=0.04). Also, mean erythema duration was 2.5 weeks (range 1.5-4) in the combined laser group versus 8 weeks (range 5-12) in the CO_2 laser only group (p=0.02). All 23 combined laser patients (100%) were willing to repeat their laser resurfacing versus only 15 of 25 (60%) patients in the CO_2 laser only group. Significant dermal coagulative necrosis was only seen in the CO_2 laser only group.
Conclusion: The combined laser protocol demonstrates less statistically significant morbidity than the CO_2 laser only group. Histologic analysis confirms the safety and efficacy of this protocol. Patients prefer the combined laser protocol to the CO_2 only laser protocol.

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THE EFFECT OF VARIABLE PULSE WIDTH OF ERBIUM:YAG LASER ON THE FACIAL SKIN

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Purpose: To evaluate the effect of various pulse durations of Erbium:YAG laser on the depth of ablation and residual thermal damage

Methods: Pre-auricular skin of a volunteer subject was exposed to a fluence of 5 J/cm^2 with pulse durations of 250, 350 and 700 μs. Number of passes varied between 6 and 16 and the repetition rate was 3 to 5 Htz. The laser treated skin was excised, processed, stained with hematoxylin and eosin and a microscopic evaluation was done

Results: All biopsy sites showed an ablation depth of about 200 μm and a residual thermal damage of upto 50 μm

Conclusion: Increased pulse duration of 700 μs of Erbium:YAG laser has little or no effect on the residual thermal damage. This suggests that increased pulse duration of 700 μs would not increase the recovery time and may have a beneficial effect on hemostasis

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TITLE: LASER RESURFACING WITH SIMULTANEOUS ERBIUM:YAG AND CO2 LASER (DERMA-K^{TM})

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Dermatology Associates of SanDiego County, Inc.

Purpose: To evaluate clinically and histologically the effects of combining the Erbium:YAG laser with a low fluence CO2 laser simultaneously for laser resurfacing.

Methods: Ten patients were treated with this modality. The Erbium:YAG was utilized at a fluence of 1.7J through a 4mm diameter pulse simultaneously the CO2 laser was used at a setting of 5 watts and 50ms duty cycle. Patients were evaluated clinically at one week, one month, two months, and three months. 2mm punch biopsies were taken from the pre-auricular treated area before and immediately after treatment as well as three months after treatment.

Results: All patients were 100% re-epithclialized within seven days. No episodes of hyperpigmentation occurred in this patient population. The mean duration of erythema was between four and eight weeks. Clinical improvement in the wrinkling score averaged 50%. Collagen deposition as demonstrated by the thickness of new collagen at three months was approximately 50% greater than with laser resurfacing with the Erbium:YAG laser alone.

Conclusions: Ublike the use of Erbium:YAG laser alone, combining the CO2 laser with the Erbium:YAG laser resulted in marked hemostasis and evidence of increased collagen deposition as well as an increase in clinical improvement scores as compared to patients previously treated with the Erbium:YAG laser alone.

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TREATMENT OF LEG TELANGIECTASIA USING A LONG-PULSE DYE LASER AT 595NM WITH AND WITHOUT DYNAMIC COOLING

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The long-pulse PDL at 595nm and pulse duration of 1.5 msec has been shown to improve clearance of larger vessels such as those seen in leg telangiectasia. The objectives of this study are two-fold. First, to determine the effect of the dynamic cooling device (DCD) in clearance of leg telangiectasia using a long-pulse PDL at 595nm. Next, to determine the effect of the DCD in reducing transient discomfort associated with treatment and in reducing epidermal damage (blistering, hyper/hypo-pigmentation) caused by the laser.

Matched treatment sites were compared at energy densities of 20 and 24 J/cm^2 with and without the use of the cryogen spray in 18 patients. In areas treated without the DCD, the laser pulse was delivered through a single layer of spenco 2nd skin. Patients received two treatments 6 weeks apart. Discomfort ratings, clearance of leg telangiectasia and complications were assessed.

A reduction in discomfort ratings was found in most patients using the DCD. Without cooling, most patients described the pain as moderate or severe; with cooling most described it as slight or none. Conversely, an increase in pain with cooling was reported in 9/72 treatment sites.

Twelve week follow-up data revealed at the 20 J/cm^2 treatment sites, 61.6% of DCD sites showed > 50% clearance compared to 55.5% of non-DCD sites. At the 24 J/cm^2 treatment sites, 61.6% of DCD sites showed > 50% clearance compared to 66.6% of non-DCD sites. Incidence of blistering immediately following treatment was 31.6% in DCD sites versus 21.1% in non-DCD sites. At the 12 week follow up hyperpigmentation persisted in 83% of DCD sites versus 80.6% of non-DCD sites. Further evaluation of clearance and side effects at 6 months will be discussed.

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EFFECT OF CRYOGEN SPRAY COOLING ON TREATMENT OF LEG TELANGIECTASIA WITH 585 NM, 1.5 MSEC AND 755 NM, 3 MSEC LASERS.

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Clearance of leg telangiectasia up to 1.5 mm diameter has been demonstrated with millisecond duration pulses at a variety of visible and infrared wavelengths. The purpose of this study was to determine the ability of cryogen spray cooling to improve laser treatment of leg veins using a pulsed dye and pulsed alexandrite laser.

Twenty subjects underwent a single treatment of 3 x 3 cm patches of leg telangiectasia up to 2 mm in diameter with a 595 nm, 1.5 msec pulsed dye laser (fluences 20-25 J/cm^2) and a 755 nm, 3 msec pulsed alexandrite laser (fluences 35-45 J/cm^2) with and without cryogen spray cooling.

Follow-up evaluations were performed at 4, 8 and 12 weeks after treatment. Efficacy was determined by subjective evaluation and blinded photographic analysis. The incidence of adverse effects, including hypopigmentation, hyperpigmentaiton, atrophic and hypertrophic scarring was noted. The potential advantages of cryogen spray cooling during laser treatment of leg veins, by providing epidermal protection and safer use of higher fluences, are discussed.

Cryogen spray cooling may enable better clearing of leg veins with pulsed dye and alexandrite lasers by allowing for the safe delivery of higher fluences necessary for photocoagulation of leg telangiectasia.

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EPIDERMAL COOLING CRYSTAL COLLAR (E3C) DEVICE FOR IMPROVED RESULTS ON LEG VEINS USING INTENSE PULSED LIGHT

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The previously described method of intense pulsed light (IPL), utilizing non-coherent yellow, red and near infrared wavelengths causing selective photothermal sclerosis of telangiectasia has been well described. In order to circumvent epidermal heating and allow greater fluence to be delivered safely, a new device which circulates water around the IPL crystal in contact with the skin at 1-4 ° C range was utilized in a clinical trial. Fifteen patients were treated using two identical sites, one was treated without epidermal cooling and the other with the epidermal cooling crystal collar (E3C) device. At one month results were evaluated by comparison with pre-treatment photographs. A crossover was performed at the one month visit in which the non-E3C site was treated by cooling. Parameters were similar (570nm filter, double 2.5msec/7msec pulses with 10 msec delay) except for a 10 – 20% increase in fluence for the E3C sites and the ability to place the crystal directly on the skin with only a thin layer of cooling gel. Sites were graded worse, unchanged or improved. For the non-E3C sites at one month, 7 were improved, 5 unchanged and 3 worsened. For the E3C sites at one month, 10 were improved, 5 were unchanged and none were worse. For the crossover treatment, 8 non-E3C sites (unchanged or worsened) were subsequently treated with E3C, results were 6 improved and 2 showed no change. Visual trends noted with E3C treated sites were far less non-specific erythema and edema. Epidermal injury involving hyper- or hypopigmentation, crusting or vesiculation was not observed in any of the E3C cooled sites, but was recorded in 3 of the non-cooled sites. We conclude that epidermal cooling allows delivery of higher IPL fluences most likely accounting for the increased efficacy. Patient comfort is increased and the treatment becomes less operator dependent since the chilled crystal may be placed directly in contact with the skin.

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LASER TREATMENT OF LEG VEINS DIODE PUMPED DYE LASER

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To determine the safety and efficacy of a diode pumped dye laser (585-605 nm,1-50 ms, 1-2 mm) at removing leg veins.

40 subjects skin type I-III and with leg veins measuring up to 2.0 mm were treated at two laser centers. Each subject received up to three treatments at four sites given at four to six week intervals. Follow up was done at 1, 3 and 6 months following the final treatment which assessed treatment response photographically as well as side effects.

Early preliminary results to date show vessel fading in 75% of subjects treated, with transient pigmentary changes.

The diode pumped dye laser is safe and effective at removing leg veins

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Long term results of treatment of leg telangiectasias using a variable pulse width 532nm Nd:YAG laser

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The purpose of this study was to optimize parameters for the treatment of superficial leg telangiectasias with a variable pulse width 532nm Nd:YAG laser (Versapulse with HELP-G). Pilot studies demonstrated short term efficacy of the Versapulse laser on leg veins less than 2mm in diameter. We examined the long term efficacy of the Versapulse laser with HELP-G on leg veins with specific reference to pulse duration, spot size, fluence, number of passes and the presence of epidermal chilling.

Forty patients with untreated superficial spider veins less than 2mm in diameter were treated at 6 week intervals with the Versapulse laser with HELP-G and followed for 12 months. Optimal pulse duration was related to vessel diameter. Longest pulse durations of 50 msec, spot sizes of 5mm and fluences of 12-16j/cm2 produced the most reproducible results and the least epidermal injury. Complications were rare but included blistering, transient hypopigmentation and hyperpigmentation and incomplete clearance.

We conclude that at the 532 nm wavelength, longer pulse durations and larger spot sizes are necessary due to limited depth of absorption for successful treatment of leg veins. The presence of variable pulse widths, sufficient fluence and epidermal chilling enables the use of the Versapulse with HELP-G to effectively treat leg telangiectasias.

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LONG PULSE ALEXANDRITE (755 NM) AND DIODE (800 NM) LASERS IN THE TREATMENT OF LOWER EXTREMITY TELANGIECTASIA. A COMPARATIVE CLINICAL STUDY

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Over the years a wide variety of laser and nonlaser pulsed thermal devices have been introduced for the treatment of lower extremity telangiectasia. More recently Long Pulsed Alexandrite (755 nm) and Diode (800 nm) have been reported to show efficacy in the treatment of leg telangiectasia. In an attempt to further explore the efficacy and complications associated with the use of these lasers, 14 patients were treated in a comparative fashion using a pulsed 20 msec Alexandrite laser and a pulsed 30 msec Diode laser. Patients were treated at fluences of 30-35 J/cm^2 at 755 nm and 40 J/cm^2 at 800 nm. Patients were evaluated at one month intervals and re-treated when appropriate. Although small red vessels showed no response to either laser, larger blue vessels showed significant response after multiple treatments. Preliminary data suggests that pulsed 755 nm Alexandrite and 800 nm Diode lasers may be of benefit in the treatment of certain leg telangiectasia.

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TREATMENT OF LEG TELANGIECTASIA BY A PULSED, 915 NM INFRARED LASER SYSTEM.

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The aim of this project was to investigate a new pulsed, 915 nm laser system for the treatment of leg telangiectasia. A study was designed to evaluate if the longer wavelength and millisecond pulse width range would be beneficial for the treatment of leg veins. The laser is a semiconductor, diode laser at a wavelength of 915 nm (near infrared) that emits a range of pulse widths from 10 to 50 msec. Pulses are delivered through an optical hand piece which provides refractive index matching, a square output aperture of 9 by 9 mm and cooling of the skin surface to 10°C. Only leg telangiectasia without underlying incompetence of the superficial venous system, as assessed by Doppler examination, were included in the study. The leg telangiectases were classified according to clinical appearance (blue or red, linear, arborizing or spider) and vessel diameter. The vessel diameter was measured from computer images, taken with a polarized CCD camera. The sizes varied between <400 mm to 1 mm. 25 subjects were treated in 2 test sites, using varying fluences (20-75J/cm^2) and varying pulse widths 10 to 50 msec. The threshold fluence for 2 different clinical endpoints, i.e. vessel thrombosis and vessel disappearance was first determined. Each test area was then treated with each treshold flluence. Two treatments were given at a monthly interval. Follow-up was done for up to 3 months after the last treatment. Blinded analysis of results was obtained by presentation of polarized photographs of treatment fields to a panel of observers not involved in the study performance. Vessel clearance at the threshold fluence for vessel disappearance was significantly higher than at the threshold fluence for vessel thrombosis: 40% of patients obtained a 100% clearing rate after two treatments, at the threshold fluence for vessel disappearance, compared to 8% at the threshold fluence for vessel thrombosis. Transient hyperpigmentation (14%) and telangiectatic matting (11%) were seen. The pulsed, 915 nm diode laser is effective method for removal of leg telangiectasia.

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THE UTILIZATION OF A NEW ND:YAG PULSED LASER (1.064 MICRONS WAVELENGTH) FOR THE TREATMENT OF VARICOSE VEINS

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Purpose of Study: The purpose of the present study is to describe a new Nd:YAG laser operating at a wavelength of 1.064 nm for treating Class I-III reticular veins after proximal sites of reflux have been addressed. A technology now exists whereas laser light may be utilized as a sole modality for treating larger diameter vessels as presented in this study.

Research Design: Ten patients ages 20-42 (mean 32 years) with Class I-III reticular and truncal varicosities were treated with the Nd:YAG pulsed laser (1.064 nm). Vessels < 1mm DP, PD 7 msec/7msec; vessels > 1 mm SPDD 14 msec, Energy 120J/cm^2. Reflux of perforators and the greater and lesser saphenous veins were ruled out by Duplex evaluation and PPG studies. Vein disappearance was assessed by digital imaging and optical chromatography (Minolta Systems).

Summary of Results: An average of 2.5 treatments produced 100% clearing in 8 or 10 patients as proven by clinical and chromatographic optical studies. (Erythema index was reduced to < 1.0 in all 11 patients). Bruising was noted in 20% of patients. Post laser hyperpigmentation was noted in 10% of patients.

Conclusions: A new effective laser modality (1.064 nm Nd:YAG Laser) is now available which produces effective photothermolysis of larger diameter lower extremity vessels.

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INITIAL RESULTS WITH A NEW SYNCHRONIZED PULSED 1064NM LASER FOR LARGER LEG TELANGIECTASIAS

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The role of lasers and intense pulsed light sources in treatment of leg veins continues to evolve. We recently had the opportunity to investigate whether a new near infrared laser (1064nm, Vasculight™,ESC/Sharplan, Needham,MA) with variable pulse durations would improve the laser and light based treatment of superficial leg telangiectasia up to 3mm. In the initial trial, 50 sites on 30 patients were enrolled. Specific parameters were utilized on similar vessel sizes beginning with a single 14–16 msec pulse for largest vessels (0.7 – 3 mm) and a double pulse (5-8 msec) for the smallest vessels (0.3 – 0.7mm). Improvement was judged by comparison of digital images (640x480, 16M colors, fluorescent lighting) at one month, two months and three months post treatment. Five categories of improvement based on size and number of vessels remaining were assigned.

Immediate results were contraction, darkening, erythema and/or urtication with total vessel closure as indicated by absence of blanching and visual elimination of the vessel border. Some sample 3mm diameter vessels were closed when visualized by 10 MHz Duplex ultrasound. Bruising from vessel rupture was seen in approximately 30%. No epidermal injury was noted in any sites. At three months, improvement in treated sites was 3.1 with the majority of sites improved by 75% clinically. Side effects included hyperpigmentation (42%) which appeared very similar to post-sclerotherapy hyperpigmentation and resolved in 83% at the 3 month follow-up. The multiple synchronized pulsed 1064nm laser is a valuable modality for closure and subsequent clearance of leg telangiectasias from 0.7mm to 3mm with minimal side effects.

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INFLUENCE OF HAIR GROWTH CYCLE ON EFFICACY OF LASER HAIR REMOVAL.

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Four studies were performed to determine the influence of hair growth cycle on the efficacy of laser hair removal. Before laser exposure, 10 anagen and 10 non-anagen follicles were identified on a photothrichogram in 100 subjects (50 for normal-mode 694nm ruby laser and 50 for 800 nm diode laser). At the final follow-up visit (9-12 months), these same follicles were identified by exact location, and assessed for hair regrowth or hair loss. The influence of the time between the first and second treatment was also studied in 24 subjects. 12 subjects were treated in 12 test sites, using a normal-mode ruby laser or a 800 nm diode laser. Additionally, there was a shaved, unexposed control site. Of the 12 sites, 2 received 1 treatment and the remaining 10 received a second treatment at fixed time intervals: 1,2,4,8, and 16 weeks. In another12 subjects, two treatments with a normal-mode ruby laser, with a fixed interval of 1 month between treatments, was compared with two treatments in which the second treatment was given when the hair started to grow back. Hair counts were obtained prior to treatment and at 1,3, 6,9 and 12 months post laser treatment using digital images obtained with a CCD camera. Hair regrowth was also assessed blindly by a group of independent observers. There was no difference in the probability of hair loss for follicles which were actively growing (anagen) vs.resting (telogen, catagen). Destruction of individual follicles was possible irrespective of hair growth cycle. Since the location of the bulge is independent of growth cycles, these observations suggest that the stem cells in the bulge region are the target for permanent hair removal.